

Revealing the Interface in Sustainable Polymer Nanocomposites

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The field of polymer nanocomposites, where discrete nanoparticles are incorporated into a polymer matrix, has grown over the last several decades to produce numerous materials with novel properties at very low loading levels of the nanoparticles. However, new concerns for the cost and sustainability of the nanoparticles used have motivated the search for new systems. Systems which employ bio-derived nanoparticles, such as cellulose nanofibers, and which utilize bio-derived polymers are being proposed as substitutes for petrochemical based materials. To enable US industry to use these materials in measurement tools are needed with the capability to facilitate the development of the fundamental structure-processing-property relations associated with this class of new materials. Specifically, measurement tools are needed to characterize the interface in bio-based polymer nanocomposites. The initial results and potential capabilities, offered by interface characterization using Forster Resonance Energy Transfer (FRET) and confocal lased scanning microscopy will be presented.